Alpine Plant Life

This is the first book to provide comprehensive information on the anatomy and ecology of arctic and alpine plants from cold sites around the globe, including representative species from Greenland, Iceland, Svalbard, Himalaya, Japan, Argentina, Ecuador and Western USA. It presents the study sites, including characteristic landscape and vegetation photographs. It also discusses species distribution, habitat preferences and features plant pictures, particularly focusing on the specific stem anatomical features, which differ in many cases from temperate zone herbs. Furthermore, each plant is characterized according to a newly constructed codification system. Based on the first author's 20-years of field research, a close collaboration with numerous botanical gardens, and the vast ecological experience of the other authors, the book presents approximately 350 species. The general layout is comparable to Doležal et al's 2018 book Anatomy, Age and Ecology of High Mountain Plants in Ladakh, the Western Himalaya.

This book examines the unique form, function and physiology of tropical alpine plants.

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Found in every plant species, the diversity of endophytic micro-organisms can be extremely high within different plant organs and tissue types. In trees, their ecological roles with respect to host tree can vary from latent pathogens or saprophytes to neutral commensalists and mutualists. Given their high diversity, and their bio-active nature, endophytes are currently being associated with a role in tree health against insect herbivores and fungal pathogens, as well as improving tree properties in phytoremediation. Meanwhile

there is increasing interest in the potential of some tree endophytes as new sources of drug compounds. The first book on tree endophytes in several years, and containing contributions from leading authors in the field, this book provides an important reference text for professional researchers and advanced students.

The United Nations Conference on the Environment and Development (UNCED), held in Rio de Janeiro in 1992, spawned a multitude of pro grammes aimed at assessing, managing and conserving the earth's biological diversity. One important issue addressed at the conference was the mountain environment. A specific feature of high mountains is the so-called alpine zone, i. e. the treeless regions at the uppermost reaches. Though covering only a very small proportion of the land surface, the alpine zone contains a rela tively large number of plants, animals, fungi and microbes which are specifi cally adapted to cold environments. This zone contributes fundamentally to the planet's biodiversity and provides many resources for mountain dwelling as well as lowland people. However, rapid and largely man-made changes are affecting mountain ecosystems, such as soil erosion, losses of habitat and genetic diversity, and climate change, all of which have to be addressed. As stated in the European Community Biodiversity Strategy, "the global scale of biodiversity reduction or losses and the interdependence of different species and ecosystems across national borders demands concerted international action". Managing biodiversity in a rational and sustainable way needs basic knowledge on its qualitative and quantitative aspects at local, regional and global scales. This is particularly true for mountains, which are distributed throughout the world and are indeed hot spots of biodiversity in absolute terms as well as relative to the surrounding lowlands.

"A field guide helping readers identify, understand, and

protect the plants and animals of the alpine zones of Maine, New Hampshire, and Vermont, including introductions to the history, geology, weather, climate, scientific research, and conservation of New England's alpine summits"--

The landscape and vegetation of the Dolomites have characteristics that are very particular. Some 2300 species live here, about a fifth of the flora in Europe as a whole. This book depicts what the plant cover of the Dolomites is composed of, how it was formed, and what future evolution may bring. The data presented is based on the authors' combined botanical research, which consists of thousands of surveys throughout the entire region of the Dolomites. To explain the vegetation, 106 plant communities are described in detailed datasheets. Biological, geological, climatic and physical-chemical parameters are given for each plant community, including a description of the habitat, the indicator species, the floristic composition, distribution, conservation, and alteration risks, as well as a distribution map and a photo of the association. The associations are grouped into habitats, such as the human habitat, natural forests and meadows on the valley floor, the coniferous forest belt, screes, alpine vegetation on granite, porphyry, and volcanic rock, as well as on dolomite and limestones. In closing, the authors make a case for using the scientific information provided in the book for the conservation of the Dolomites, the heritage of all humanity. Additional in-depth analysis will be presented in the supplementary volumes "Plant Life of the Dolomites: Vegetation Tables" and "Plant Life of the Dolomites: Atlas of Flora."

This book provides case studies and general views of the main processes involved in the ecosystem shifts occurring in the high mountains and analyses the implications for nature conservation. Case

studies from the Pyrenees are preponderant, with a comprehensive set of mountain ranges surrounded by highly populated lowland areas also being considered. The introductory and closing chapters will summarise the main challenges that nature conservation may face in mountain areas under the environmental shifting conditions. Further chapters put forward approaches from environmental geography, functional ecology, biogeography, and paleoenvironmental reconstructions. Organisms from microbes to large carnivores, and ecosystems from lakes to forest will be considered. This interdisciplinary book will appeal to researchers in mountain ecosystems, students and nature professionals. This book is open access under a CC BY license.

This book provides a compact, up-to-date and detailed overview of the vegetation of the Iberian Peninsula, a highly diverse part of Europe in the Mediterranean area. Written by a group of experienced researchers, the volume includes a first section with general chapters discussing the climate, the biogeography and the flora, and a second section with detailed descriptions of the 14 regional sectors into which the peninsula and Balearic Islands have been divided. A third section explores special features, such as aquatic vegetation, gypsum and dolomite vegetation, coastal vegetation, mountain flora and vegetation, conservation issues and alien

flora.

Margins are by their very nature environmentally unstable - does it therefore follow that plant populations adapted for life in such areas will prove to be pre-adapted to withstand the changes that may be brought about by a warmer world? Biogeography, demography, reproductive biology, physiology and genetics all provide cogent explanations as to why limits occur where they do, and the purpose of this book is to bring together these different avenues of enquiry. Crawford's numerous beautiful illustrations of plants in their natural habitats remind us that the environment remains essential to our understanding of plants and their function. This book is suited to students, researchers and anyone with an interest in the impact of climate change on our world.

This long-anticipated reference and sourcebook for California's remarkable ecological abundance provides an integrated assessment of each major ecosystem type—its distribution, structure, function, and management. A comprehensive synthesis of our knowledge about this biologically diverse state, Ecosystems of California covers the state from oceans to mountaintops using multiple lenses: past and present, flora and fauna, aquatic and terrestrial, natural and managed. Each chapter evaluates natural processes for a specific ecosystem, describes drivers of change, and discusses how that ecosystem may be altered in the future. This book

also explores the drivers of California's ecological patterns and the history of the state's various ecosystems, outlining how the challenges of climate change and invasive species and opportunities for regulation and stewardship could potentially affect the state's ecosystems. The text explicitly incorporates both human impacts and conservation and restoration efforts and shows how ecosystems support human well-being. Edited by two esteemed ecosystem ecologists and with overviews by leading experts on each ecosystem, this definitive work will be indispensable for natural resource management and conservation professionals as well as for undergraduate or graduate students of California's environment and curious naturalists.

Demonstrates the role of landforms and rock types in producing the unique geographical distributions of plants and in stimulating evolutionary diversification

Alpine treelines mark the low-temperature limit of tree growth and occur in mountains world-wide. Presenting a companion to his book Alpine Plant Life, Christian Körner provides a global synthesis of the treeline phenomenon from sub-arctic to equatorial latitudes and a functional explanation based on the biology of trees. The comprehensive text approaches the subject in a multi-disciplinary way by exploring forest patterns at the edge of tree life, tree morphology, anatomy, climatology and, based on this, modelling treeline position, describing

reproduction and population processes, development, phenology, evolutionary aspects, as well as summarizing evidence on the physiology of carbon, water and nutrient relations, and stress physiology. It closes with an account on treelines in the past (palaeo-ecology) and a section on global change effects on treelines, now and in the future. With more than 100 illustrations, many of them in colour, the book shows alpine treelines from around the globe and offers a wealth of scientific information in the form of diagrams and tables.

This book brings together experts from different fields, who used a broad spectrum of methods to investigate the physiological and cellular adaptation of alpine plants from the tree line to the upper limits. Some articles link alpine plant physiology with physiological adaptations observed in polar plants. Tolerance against often high light intensities (including UV), cold or freezing temperatures, in addition to the need for fast tissue development, flowering, and propagation that is managed by alpine plants are to some extent underrepresented in recent research. This volume considers ice formation and winter conditions in alpine plants; the fate of cryophilic algae and microorganisms; cell structural adaptations; sexual reproduction in high altitudes; the physiology of photosynthesis, antioxidants, metabolites, carbon and nitrogen; and the influences of microclimate (temperatures at the plant level, heat

tolerance), UV light, weather and ozone. Further information on life processes in alpine extreme environments may additionally yield new insights into the range of adaptation processes in lowland plants.

Inselbergs are isolated rock outcrops that stand out abruptly from surrounding plains. Despite the widespread occurrence of granite inselbergs throughout all climatic and vegetational zones, their remarkably rich plant life was largely neglected in the recent literature. This richly and partly in color illustrated volume provides a detailed survey of all major abiotic and biotic features characteristic for inselbergs. The extreme environmental conditions on inselbergs are described in depth as well as specific adaptive traits of rock outcrop plants including their morphological, anatomical and physiological responses. The diversity and structure of inselberg plant communities are examined on a global scale with detailed regional accounts for different tropical and temperate zones.

With non-technical descriptions and more than 500 photos and drawings, this full-color field guide invites readers to explore the Pacific Northwest's diverse array of mountain wildflowers, ferns, trees, and grasses.

This book is a completely revised, substantially extended treatment of the physical and biological factors that drive life in high mountains. The book covers the characteristics of alpine plant life, alpine climate and soils, life under snow, stress tolerance, treeline ecology, plant water, carbon, and nutrient relations, plant growth and productivity, developmental processes, and two largely novel chapters on alpine plant reproduction and global change biology. The book explains why the topography driven exposure of plants to dramatic micro-climatic gradients over very short distances causes alpine biodiversity to be particularly robust against climatic change. Geographically, this book draws on

examples from all parts of the world, including the tropics. This book is complemented with novel evidence and insight that emerged over the last 17 years of alpine plant research. The number of figures – mostly in color – nearly doubled, with many photographs providing a vivid impression of alpine plant life worldwide. Christian Körner was born in 1949 in Austria, received his academic education at the University of Innsbruck, and was full professor of Botany at the University of Basel from 1989 to 2014. As emeritus Professor he is continuing alpine plant research in the Swiss Alps.

This book will provide a complete overview of an alpine ecosystem, based on the long-term research conducted at the Niwot Ridge LTER. There is, at present, no general book on alpine ecology. The alpine ecosystem features conditions near the limits of biological existence, and is a useful laboratory for asking more general ecological questions, because it offers large environmental change over relatively short distances. Factors such as macroclimate, microclimate, soil conditions, biota, and various biological factors change on differing scales, allowing insight into the relative contributions of the different factors on ecological outcomes.

“A complete guide to designing, making and planting hypertufa troughs.”—North American Rock Garden Society Hypertufa containers—also known as troughs—are rustic, striking, versatile, and perfect for small, Alpine plants. A mix of cement, perlite, peat, and water, they are simple and affordable to make at home. In Hypertufa Containers, Lori Chips details everything you need to know to make your own troughs and successfully garden in them. This hardworking book includes step-by-step instructions and color photography for making hypertufa containers in a variety of shapes and sizes. Plant portraits include growing and cultivation information, along with potting tips.

A concise introduction to the science behind the success of

alpine plants, this fascinating and accessible book will enable gardeners to tailor their cultivation practices in lowland gardens to mimic the alpine habitat as closely as possible. Aquatic plants refer to a diverse group of aquatic photosynthetic organisms large enough to be seem with the naked eye, and the vegetative parts of which actively grow either permanently or periodically (for at least several weeks each year) submerged below, floating on, or growing up through the water surface. These include aquatic vascular plants, aquatic mosses and some larger algae. Aquatic plants are grouped into life forms, each of which relates differently to limiting factors and has distinct ecological functions in aquatic ecosystems. Life form groups include emergent macrophytes (plants that are rooted in sediment or soils that are periodically inundated, with all other structures extending into the air), floating-leaved macrophytes (rooted plants with leaves that float on the water surface), submersed macrophytes (rooted plants growing completely submerged), free submerged macrophytes (which are not rooted but attached to other macrophytes or submerged structures) and free-floating macrophytes (plants that float on the water surface). Aquatic plants play an important role in the structure and function of aquatic ecosystems by altering water movement regimes, providing shelter and refuge and serving as a food source. In addition, aquatic plants produce large standing crops which can also stabilize sediments, accumulate large amounts of nutrients thus improving water healthy. Thus, because of their ecological role, aquatic plants are an important component of aquatic ecosystems. Aquatic plants are very vulnerable to human activities and global changes, and many species of the plants had become endangered in the past several decades due to habitat loss, flooding, damming, over foraging, biological invasion and eutrophication, which might not be halted but enforced in the

future when more extreme weathers coincide with enhanced human activities.

As human populations expand and have increasing access to technol ogy, two general environmental concerns have arisen. First, human pop ulations are having increasing impact on the earth system, such that we are altering the biospheric carbon pools, basic processes of elemental cycling and the climate system of the earth. Because of time lags and feedbacks, these processes are not easily reversed. These alterations are occurring now more rapidly than at any time in the last several million years. Secondly, human activities are causing changes in the earth's biota that lead to species extinctions at a rate and magnitude rivaling those of past geologic extinction events. Although environmental change is potentially reversible at some time scales, the loss of species is irrevo cable. Changes in diversity at other scales are also cause for concern. Habitat fragmentation and declines in population sizes alter genetic di versity. Loss or introduction of new functional groups, such as nitro gen fixers or rodents onto islands can strongly alter ecosystem processes. Changes in landscape diversity through habitat modification and frag mentation alter the nature of processes within and among vegetation patches. Although both ecological changes altering the earth system and the loss of biotic diversity have been major sources of concern in recent years, these concerns have been largely independent, with little concern for the environmental causes the ecosystem consequences of changes in biodiversity. These two processes are clearly interrelated. Changes in

ecological systems cause changes in diversity. Ecosystem Consequences of Soil Warming: Microbes, Vegetation, Fauna and Soil Biogeochemistry focuses on biotic and biogeochemical responses to warmer soils including plant and microbial evolution. It covers various field settings, such as arctic tundra; alpine meadows; temperate, tropical and subalpine forests; drylands; and grassland ecosystems. Information integrates multiple natural science disciplines, providing a holistic, integrative approach that will help readers understand and forecast future planetwide responses to soil warming. Students and educators will find this book informative for understanding biotic and biogeochemical responses to changing climatic conditions. Scientists from a wide range of disciplines, including soil scientists, ecologists, geneticists, as well as molecular, evolutionary and conservation biologists, will find this book a valuable resource in understanding and planning for warmer climate conditions. Emphasizes biological components of soils, plants and microbes that provide linkages to physics and chemistry Brings together chapters written by global scientific experts with interests in communication and education Includes coverage of polar, alpine, tropical, temperate and dryland ecosystems

Two of the Northwests most respected nature writers have collaborated once again to produce an outstanding field guide to the plants that grow at high elevation, above the tree line, in the mountain systems of the Western Cordillera. The book features more than 500 plants found in the alpine regions of western North

America. MacKinnons and Pojars rich and engaging notes on each species include descriptions of the unique characteristics of each plant, as well as of its habitat and range. The book features full-colour photographs throughout. Whether you are a professional botanist, a mountain guide, an amateur naturalist or simply an outdoor enthusiast who loves to brave the high country, you will find this book of immense value. Among other virtues, it will help to enhance your appreciation of the fragility and vitality of this unique group of plants, and to realise the need for care and responsibility when navigating alpine meadows and mountain slopes.
Generations of plant scientists have been fascinated by alpine plant lifean ecosystem that experiences dramatic climatic gradients over a very short distance. This comprehensive book examines a wide range of topics including alpine climate and soils, plant distribution and the treeline phenomenon, plant stress and development, global change at high elevation, and the human impact on alpine vegetation. Geographically, the book covers all parts of the world including the tropics.
This is the first detailed analysis of the complex and rich vegetation of the mountainous Korean peninsula, which ranges from arctic-alpine to subtropical in character, and in which more than 4500 vascular-plant species have been recorded, including many endemics. It covers both the north and south of the peninsula and, using both past and present records, identifies eight major biogeographic regions. It pays due attention to vegetation history, tracing this back to Miocene times and noting the effects of Pleistocene climatic fluctuations. More recently,

detailed climatic variations from 50 B.C. are recorded, along with man's influence on vegetation patterns. Special mention is made of the present arctic-alpine communities, their structural and floristic characteristics, their origins, and their vulnerability to current global warming. Throughout the relationships between Korean vegetation communities and those present in adjacent East Asia are emphasized along with those key features which make Korean communities distinctly unique.

With this reference, gardeners can successfully replicate alpine plants' native conditions, allowing them to grow such choice alpines as gentians, daphnes, and Dianthus. Dramatic photographs and descriptions take readers through the Pyrenees, Alps, Balkans, and Carpathians to capture the charms of these unique mountain plants.

Presenting a global and interdisciplinary approach to plant ecology, this much-awaited new edition of the book Plants and Vegetation integrates classical themes with the latest ideas, models, and data. Keddy draws on extensive teaching experience to bring the field to life, guiding students through essential concepts with numerous real-world examples and full-colour illustrations throughout. The chapters begin by presenting the wider picture of the origin of plants and their impact on the Earth, before exploring the search for global patterns in plants and vegetation. Chapters on resources, stress, competition, herbivory, and mutualism explore causation, and a concluding chapter on conservation addresses the concern that one-third of all plant species are at risk of extinction. The scope of this edition is broadened further by a new chapter on

population ecology, along with extensive examples including South African deserts, the Guyana Highlands of South America, Himalayan forests and arctic alpine environments.

Let the experts at the Royal Botanic Gardens guide you around the beautiful and mysterious world that is the plant kingdom. From regulating the air we breathe to providing food, clothes, fuels, and medicines - plants are fundamental to our lives. Discover an extraordinary diversity of species, which includes a grass that grows a meter a day, roots that breathe air, and "queen of the night" cactuses whose rare blooms vanish before dawn. In a combination of art and science, Flora celebrates plants from majestic trees to microscopic algae, explaining how they germinate, grow, and reproduce. It presents species that have evolved to accommodate pollinating insects such as the foxglove, and plants that have adapted to flourish in even the most hostile of habitats. Pierre-Joseph Redoute in the 18th-century was described as the "Raphael of flowers". Flora showcases his botanical paintings as well as those of Georg Ehret and others in this gorgeous visual celebration of plants through the ages. Whether you are a keen gardener, naturalist, or botany student, this beautiful book is a treat that will entice, inform, and amaze.

Brighter zinnias, fragrant carnations, snappier green beans Plant Breeding for the Home Gardener makes it easier than ever to breed and grow your own varieties of vegetables and flowers. This comprehensive and accessible guide explains how to decide what to breed, provides simple explanations on how to cross plants, and features a basic primer on genetics and advanced techniques. Case studies provide breeding examples for favorite plants like daffodils, hollyhocks, roses, sweet corn, and tomatoes.

North America is replete with beautiful aplines, and this guide is equally useful to the traveler or the gardener for its identification, propagation, and cultivation information.
Structure, physiology, evolution, systematics, ecology. Generations of plant scientists have been fascinated by alpine plant life - with the exposure of organisms to dramatic climatic gradients over a very short distance. This comprehensive text treats a wide range of topics: alpine climate and soils, plant distribution and the treeline phenomenon, physiological ecology of water-, nutritional- and carbon relations of alpine plants, plant stress and plant development, biomass production, and aspects of human impacts on alpine vegetation. Geographically the book covers all parts of the world including the tropics.This second edition of Alpine Plant Life gives new references, new diagrams, and extensively revised chapters.
Offers full-page color plates of approximately one hundred different flowers and plants in their native habitat accompanied by brief text containing botanical information.
This pocket field guide to identifying 230 common Alpine flowers is packed with all the information you need to recognise your favourites while out in the mountains. Designed for the non-specialist, this little handbook is arranged by colour and also includes a glossary of flower parts and an introduction which describes the amazing lengths that these tiny gems go to to survive at altitude. Alpine expert author Gillian Price says: 'It never ceases to amaze me that such tiny plants can spend months on end buried under metres of snow and ice - weathering temperatures as low as minus 25°C - then sprout back to life when things thaw out and warm up. In springtime you can spot the fragile purple petals of the Alpine Snowbell pushing their way through snow - they contain an anti-freeze that enables them to melt it. Masters of adaptation and survival,

alpine flowers can trap insects, store precious water, expel excess minerals and fool insects.' Each flower entry includes a clear photograph and essential description along with its name in English, Latin, German, French and Italian and interesting information about the origins of some of the more curious flower names. Each one is also indexed by its English and its Latin name so you can follow up a hunch about a name or find out more about a flower.